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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,436	02/23/2004	William M. Hiatt	2269-5868US (01-0764.00/U)	2546
24247	7590	01/04/2008	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			SCHILLINGER, LAURA M	
			ART UNIT	PAPER NUMBER
			2813	
			NOTIFICATION DATE	DELIVERY MODE
			01/04/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTOMail@traskbritt.com

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Office Action Summary	Application No. 10/784,436	Applicant(s) HIATT, WILLIAM M.	
	Examiner Laura M. Schillinger	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/30/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anthony ('836), and further in view of Narahara et al ('834).

Anthony teaches the following claimed limitations as cited below:

1. (Original) A method for electrically coupling a first side of a semiconductor substrate to a second side of said semiconductor substrate, comprising:
forming a hole having an inner surface from a first side of a semiconductor substrate to a second side of said semiconductor substrate (Fig.1 (12)) and
plating said inner surface of said semiconductor substrate to form a plated conductive element by forcing a plating solution from said first side of said semiconductor substrate and exiting the plating solution to said second side of said semiconductor substrate through said hole (Fig.3 (18) and Col.5, lines: 45-50- teaching to cause the plating solution to flow through the holes).

Anthony teaches boring a hole through an electrically insulating glass substrate for semiconductor applications. This effectively creates a substrate with an inner insulating surface

and therefore Anthony fails to teach Applicant's amended claim limitation requiring the additional step of forming an insulating layer on the inner surface of the hole and then plating over the insulating layer.

However, Narahara teaches oxidizing the inner surface of a hole to improve adhesion to a subsequently plated metal layer (Col.1, lines: 45-65). It should be noted that Anthony teaches a hole having an inner surface from the first side to a second side of a substrate (Fig.1 (12)).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Anthony to include forming an insulating layer inside the hole in order to improve adhesion to the subsequently plated metal layer as taught by Narahara (Col.1, lines: 45-65).

Moreover, such a film forming step would produce predictable results since the glass substrate is insulative and therefore the hole formed would have an insulating surface and further forming a insulating film in a through hole would also create a hole having an insulting inner surface. In this combination, Anthony's hole which extends from the first to the second side of the substrate would have the insulating layer formed therein and therefore the insulating layer would also necessarily extend from the first to the second side of the substrate since oxidizing would create a conformal insulating layer to the exposed through hole. Therefore, Applicant's amended limitation on 10/30/ 07 is also rendered obvious.

2. (Original) The method of claim 1, wherein forming said hole comprises at least one of ablating, mechanically drilling and chemically etching a portion of said semiconductor substrate from said first side to said second side (Col.2, lines: 45-55).
3. (Original) The method of claim 1, further comprising loading said semiconductor substrate into a plating fixture, said semiconductor substrate and said plating fixture cooperatively directing flow of a plating material through said hole of said semiconductor substrate (Col.1.5, lines: 45-55).
4. (Original) The method of claim 1, wherein said plating comprises electroplating said inner surface of said semiconductor substrate defined by said hole (Fig.3 (18)).
5. (Original) The method of claim 1, wherein said plating process comprises electroless plating said inner surface of said semiconductor substrate defined by said hole (Col.1, lines: 55-62).
7. (Original) The method of claim 1, further comprising etching one of said first and second sides of said substrate to expose at least one end portion of said plated conductive element (inherent- laser drilling is an etching which ultimately exposes the end portion of the plated conductive element hole).
9. The method of claim 1, wherein said hole is between approximately 50 microns and 700 microns in diameter (Col. 2, lines: 1-5- 1mil =25.4 um).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anthony ('836) and Narahara et al ('834) as applied to the claims above, and further in view of Bhatt et al ('218).

Anthony teaches the conventional method of plating a through hole. However fails to explicitly teach that the technique of plating a filled through hole.

Bhatt et al teaches that both holes to be filled and unfilled need electroplating and further teaches to utilize capping layers:

6. The method of claim 1, further comprising forming a conductive cap on at least one end of said plated conductive element (Col.3, lines: 20-25)).

8. (Original) The method of claim 7, further comprising forming a conductive cap over said at least one end portion of said plated conductive element (Fig.1 (13)) .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a conductive cap as taught by Bhatt in order to facilitate a connection with a filled hole as taught by Bhatt (Col.3, lines: 15-25)

Response to Arguments

Applicant's arguments filed 10/30/07 have been fully considered but they are not persuasive. Applicant argues that the amended claim language is not rendered obvious by the combination of Anthony and Narahara. Specifically Applicant argues that the hole referred to in the specific embodiment of Narahara does not extend all the way through the substrate as the claim language requires. Therefore the insulating film taught by Narahara does not extend from one side of the substrate to the other. This argument is not persuasive because the hole structure relied upon by the Examiner in the rejection is the hole structure of Anthony. Anthony's hole is all the way through the substrate and Narahara was relied upon only to teach the formation of an insulating film within a hole to assist in subsequent plating; not to show the hole structure itself. Narahara's treatment is a oxidizing treatment which would create a conformal insulating film. In subjecting Anthony's hole to an oxidizing treatment to assist in the adhesion of a subsequent plated layer, the insulating layer would necessarily cover the inside surface of the hole which would extend from the first to the second surface as required by the claim language. Therefore the Examiner does not find such an argument nor such an amendment persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



12/19/07

Laura M Schillinger
Primary Examiner
Art Unit 2813